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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,447	11/10/2003	Xiao Xu	ACE-00101.P.1.1-US	4588

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EXAMINER
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BOWERS, NATHAN ANDREW

ART UNIT	PAPER NUMBER
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1797

MAIL DATE	DELIVERY MODE
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09/03/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/705,447	<b>Applicant(s)</b> XU ET AL.	
	<b>Examiner</b> NATHAN A. BOWERS	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 May 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-4, 7-13, 15-26, 29-32, 34-44, 47-50, 72 and 287-310 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-4, 7-13, 15-26, 29-32, 34-44, 47-50 and 287-310 is/are allowed.
- 6) ☒ Claim(s) 72 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>053008</u> .  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 72 is rejected under 35 U.S.C. 102(b) as being anticipated by Sugihara (US 6132683).

Sugihara discloses a microelectronic cell sensor array comprising a substrate (Figure 2:2) covered by a non conductive film. As best seen in Figures 3 and 4, four electrode arrays are positioned on the substrate so that each array includes a plurality of electrodes connected to conductive patterns (Figure 4:12) and contacts (Figure 4:7). Each array additionally comprises a reference electrode (Figure 4:10). This is disclosed in column 6, lines 32-67. Column 2, lines 35-67 indicate that the cell activity is determined by measuring changes in impedance recorded by the electrodes. Additionally, Sugihara teaches that the electrically conductive traces (Figure 4:12) extend from the opposing ends of the substrate and are in communication with the electrode arrays. This is described in column 6, lines 50-67. Column 6, lines 32-44 indicates that each electrode is approximately 50 microns wide, and that the centers of each electrode are separate from each other by approximately 150 microns. Accordingly, the gaps between electrodes are well over 3 microns wide.

Sugihara does not expressly indicate that “the electrodes are arranged so that there is a more than 50% probability for cells to contact an electrode element,” however this limitation is

Art Unit: 1797

inherent to the apparatus of Sugihara. Even though substrate surface area is probably less than 50% covered by electrodes (see Figure 3), cells moving in the reaction fluid above will more than likely contact at least one of these electrodes (even if only fleetingly) before permanently adhering to the substrate bottom. Cells introduced to the device do not immediately fall to the substrate and instantly adhere to the surface. The final location of adherence and growth of the cells is irrelevant to the language of claim 72 since contact with the electrodes may occur prior to immobilization.

*Allowable Subject Matter*

Claims 1-4, 7-13, 15-26, 29-32, 34-44, 47-50 and 287-310 are allowed.

With respect to independent claim 1, the prior art does not disclose, in the claimed environment, a plurality of electrode arrays comprising electrode elements that are separated by a gap at least 3 microns wide, and are characterized by a width that is 1.5 to 15 times the width of the electrode gap. The closest prior art is the Wolf reference which is directed to detecting the presence of biological cells by measuring impedance changes at a plurality of electrode arrays. Wolf, however, does not expressly indicate that the electrode elements are wider than the gaps that separate the electrode elements, or that the gaps are at least 3 microns wide.

The Gerwen reference indicates that it is known in the impedimetric detection art to utilize electrodes that are greater in width than the gaps that separate the electrodes. See Figure 1C. However, Gerwen is not directed to the detection of cell attachment, but is instead directed to the binding of molecules such as DNA, enzymes, antibodies, etc. Gerwen teaches that high electrode width to gap width ratios are beneficial when applied to electrode arrays that operate

Art Unit: 1797

on the nanometer scale. Since Applicant's cell based system operates on a scale of many microns, one would not look to the teachings of Gerwen as guidance when designing electrodes for measuring changes in impedance due to the presence of cells. Gerwen's electrode design is focused on lowering the height of the electric field, directing the electric field into a channel, and eliminating background noise due to the presence of molecules free in solution. Since these problems are not relevant to the detection of cells growing on a planar surface, one of ordinary skill in the art would not look to Gerwen for inspiration to modify the device of Wolf.

### *Response to Arguments*

Applicant's arguments filed 30 May 2008 with respect to the 35 U.S.C. 103 rejections involving Wolf and Gerwen have been fully considered and are persuasive. These rejections have been withdrawn.

Applicant's arguments filed 30 May 2008 with respect to the double patenting rejections involving copending application nos. 11/055639 and 10/987732 have been fully considered and are persuasive. These rejections have been withdrawn.

### *Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN A. BOWERS whose telephone number is (571)272-8613. The examiner can normally be reached on Monday-Friday 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1797

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/William H. Beisner/  
Primary Examiner, Art Unit 1797

/Nathan A Bowers/  
Examiner, Art Unit 1797